

**BEACH WALK MONITORING  
ON THE NORTHERN CHANNEL ISLANDS, CALIFORNIA  
2003**



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## Executive Summary

Bald eagles, (*Haliaeetus leucocephalus*) were released on Santa Cruz Island in 2002 and 2003 as part of a study to determine the feasibility of restoring them to the northern Channel Islands off the coast of southern California. Bald eagles once nested on all the northern Channel Islands, but the introduction of DDT into the Southern California Bight led to their disappearance by the early 1960's.

To better understand the potential for contamination that the bald eagles might acquire by feeding on carcasses, a program of Beach Watch surveys was initiated in 2003. Nine beaches were monitored monthly by biologists from Institute for Wildlife Studies and the National Park Service with funding from the Montrose Settlements Restoration Program.

Standard protocols were established to conduct the surveys. Carcasses encountered were identified to species if possible and other information was collected such as condition of the carcass, whether it was scavenged, or if it was oiled. Other information about the presence of humans or animal and types and relative amounts of tar and marine debris was also recorded.

Seabirds were the most common carcasses on the Santa Cruz Island beaches. Several fish carcasses were also found, most were sharks or rays. Marine mammal carcasses were of most interest because of the potential for the high contaminant levels. In 2003, there were 12 California sea lions (*Zalophus californianus*) and one unidentified dolphin found on the Santa Cruz Island beaches in the surveys. The majority of these were found on Chinese Harbor beach.

One-time surveys were done at Santa Rosa and San Miguel Island beaches in the winter of 2003-2004. The one-time surveys caught an influx of northern fulmars (*Fulmarus glacialis*) carcasses following a similar event seen in the Monterey National Marine Sanctuary. Fourteen sea lions and three elephant seals (*Mirounga angustirostris*) were found on Santa Rosa Island and ten sea lions were found on San Miguel Island in those surveys. These islands are used more frequently by pinnipeds and there are more beaches that face into the prevailing wind and currents than on Santa Cruz. In 2004, we will begin quarterly surveys of these islands.

The majority of carcasses (78%) had been scavenged to some extent. Most of carcasses were in an advanced state of decomposition and some were mummified.

## Acknowledgements

We thank the Institute for Wildlife Studies (IWS), University of California Natural Reserve, Santa Cruz Island, and The Nature Conservancy (TNC) for conducting surveys and providing access to the island beaches on TNC property. Funding for the project was made available by the Montrose Settlements Restoration Program. Paula Rich of the National Park Service and Jessica Dooley of IWS were responsible for most of the field surveys.

### Introduction

In 2002, a bald eagle reintroduction program began at Channel Islands National Park with the release of 12 eagles on Santa Cruz Island. Bald eagles once nested on all the Channel Islands off the coast of southern California, but disappeared by the early 1960's. Contamination from the organochlorine pesticide, DDT, is thought to be the main cause of the disappearance of bald eagles from the Southern California Bight. DDE (a metabolite of DDT) levels are magnified through the food chain by bioaccumulation since the chemicals are stored in animal fat and do not readily breakdown.

To gain a better understanding of the potential contamination that bald eagles might acquire by feeding on beached animals, a program of Beach Watch surveys was initiated. Nine beaches on Santa Cruz Island were monitored monthly by biologists from Institute for Wildlife Studies (IWS) and the National Park Service (NPS). A pilot study was initiated in June 2002, on East Santa Cruz Island beaches, to adapt the Beach Walk protocol and develop a database. Funding for this program came from the Montrose Settlements Restoration Program. This report summarizes the results of the first year surveys in 2003.

### Study Area

Santa Cruz Island is located approximately 20 miles off the coast of Ventura and Santa Barbara counties. Santa Cruz Island is the largest of the eight California Channel Islands with a land area of approximately 249 km<sup>2</sup> and a coastline of nearly 124 km. Nine beaches were monitored monthly on Santa Cruz Island: Chinese Harbor, Prisoner's Harbor, Laguna Beach, Johnson's Beach, Poza (Pozo) Beach, Sauces Beach, Christy Beach, Smugglers Cove and Yellowbanks (Fig.1). These beaches were chosen because they are the largest and most accessible beaches covering most of the coastline. The beaches on the northwest portion of the island are generally small pocket beaches and access is difficult except by boat.

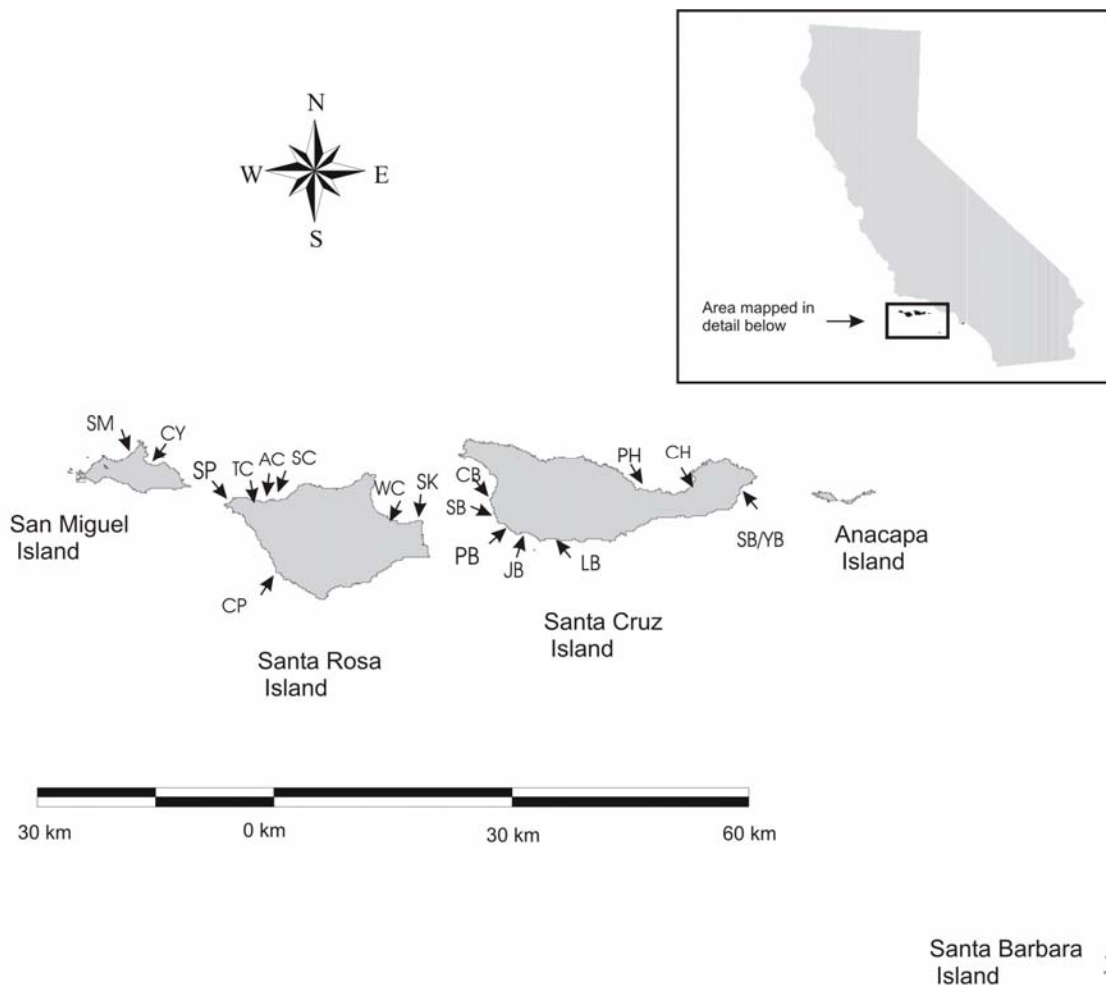


Smugglers Cove beach

## Beach Walk Monitoring

During the winter of 2003/2004, we surveyed (one time) seven beaches on Santa Rosa Island (Skunk Point, Soledad Canyon, Arlington Canyon, Tecalote Canyon, China/Cluster Point, Sandy Point, and Water Canyon) and two beaches on San Miguel Island (Cuyler Harbor and Simonton Cove) (Fig. 1).

Wind and current modeling by the Minerals Management Service (MMS) show that Santa Cruz Island has potential for being the most impacted island in the event of an oil spill. Generally, beaches facing northwest into the prevailing winds are the most susceptible to oil fouling and also to deposition of debris and potentially to beached animal carcasses. A five year marine debris monitoring program from 1989-1993 on Santa Rosa and San Miguel Islands supported this model with Sandy Point on Santa Rosa and Simonton Cove on San Miguel Island having the most debris (Richards 1994). Both beaches face northwest.



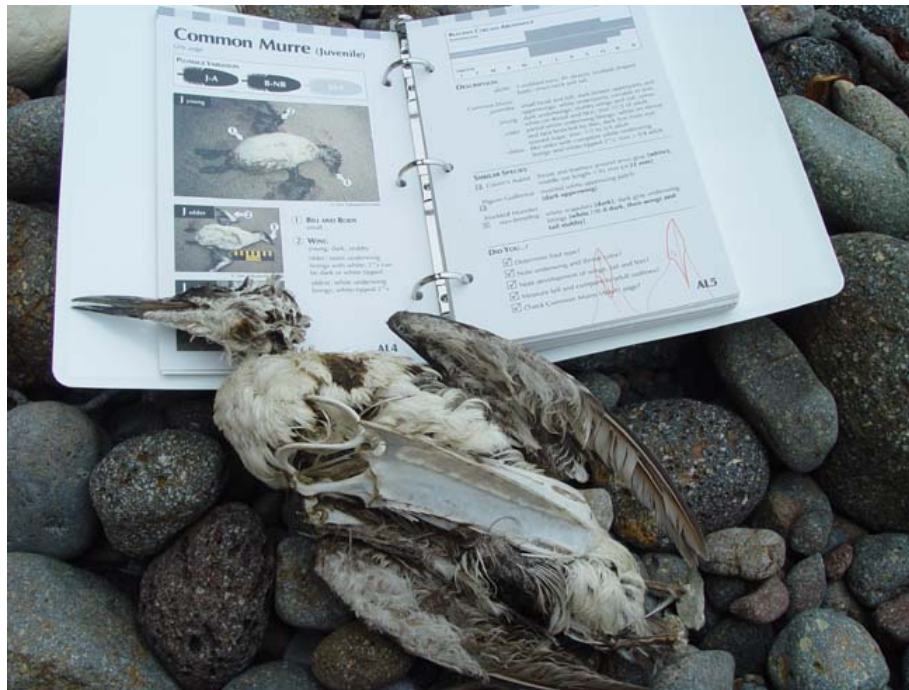
CH = Chinese Harbor; JB = Johnson's Beach; PB = Pozo Beach; SB = Saucers Beach; CB = Christy Beach; PH = Prisoner's Harbor; LB = Laguna Beach; SB/YB = Smugglers Beach/Yellowbanks Beach; SP=Sandy Point, TC=Tecalote Canyon, AC=Arlington Canyon, SC=Soledad Canyon, SK= Skunk Point, WC= Water Canyon, CP=Cluster Point/China Beach, SM=Simonton Cove, CY=Cuyler Harbor

Figure 1. Locations of beaches on Santa Rosa Island, San Miguel Island, and Santa Cruz Island where beach walk surveys were conducted in 2003 and 2004.

### Methods

The beached animal surveys were adapted primarily from Beach Watch programs at the Gulf of the Farallones and Monterey Bay National Marine Sanctuaries. A standard data sheet was developed for this program and a handbook was written to describe the program and standardize the field protocol (Appendix 1). A database was created using Microsoft Access by Laurie Kurilla of Peace of Mind Technology under contract to the NPS.

Beaches were monitored at low tide if possible to maximize the likelihood of finding beached organisms. Biologists walked the beaches monthly, recording findings onto a standard datasheet. Beached animals were the primary interest of the surveys; however, numbers of live animals present and notes on marine debris, and human activity were also recorded. Information collected about each carcass included species identification (if possible), stage of decomposition, age and sex (if possible), evidence of scavenging, evidence for cause of death, the presence of oil, and whether a photograph was taken. Photos were archived for verification of questionable identification and to create a reference/training library for monitors.



Carcasses are identified using various field guides including Beached Birds by Hass and Parrish (2000)

### Results

Smugglers and Yellowbanks beaches were surveyed between June 2002 and December 2003 by National Park Service biologists. The remaining Santa Cruz Island beaches were surveyed by IWS biologists from May to December 2003. Lyndal Laughrin, University

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of California Natural Reserve on Santa Cruz Island, surveyed the western Santa Cruz Island beaches in late 2002 and early 2003 and will be submitting a summary in the future. The majority of carcasses were found on Chinese Harbor (Table 1).

NPS biologists conducted one-time surveys of beaches on Santa Rosa Island (SRI) in November 2003 and on San Miguel Island (SMI) in January 2004 (Table 2). Soledad Canyon, SRI and Simonton Cove, SMI had the greatest numbers of beached animals on these islands. Simonton Cove had the highest single count of all beaches.

A total of 13 marine mammal carcasses were found during all surveys on Santa Cruz Island beaches in 2003. One carcass was an unidentified dolphin. The other 12 were California sea lions (*Zalophus californianus*). In addition, an unidentified piece of flesh, possibly a fragment from an elephant seal or whale was found at Christy Beach. The aged bones of a sea lion were found at Smugglers Cove during one survey. No marine mammals were found at Johnson's Beach. California sea lions were the single most abundant species found on Santa Cruz Island beaches.

In contrast, 14 California sea lions and three elephant seals (*Mirounga angustirostris*) were found on Santa Rosa Island beaches in a November 2003 survey. A total of 10 California sea lions were found on San Miguel Island beaches in one survey, January 2004.

Overall, seabirds were the most abundant beached animals with at least nine species represented. Northern fulmars (*Fulmarus glacialis*) were the most abundant species found, most of these during the winter surveys at San Miguel and Santa Rosa Islands. Western gulls (*Larus occidentalis*) were the next most abundant species.

Based only on June 2002-December 2003 surveys from Smugglers and Yellowbanks, the greatest number of carcasses were found in August. Since most of these carcasses were birds, there is little information about sex and age that we could determine.

The majority of the carcasses were in an advanced state of decomposition, usually recorded as dried/mummified. Less than 10% were recorded as freshly dead. In most cases the cause of death could not be determined. About 3% of the carcasses were oiled. In most cases the amount was minor (<2% oil cover). It cannot be determined how many of these were oiled posthumously after reaching the beach. About 78% of the carcasses had been scavenged to some extent. It was impossible to determine if some animals had been preyed on originally because of the state of decomposition.

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Table 1. Carcasses found in 2003 on Santa Cruz Island beaches.

Prey Item	Beach Surveyed						PH	LB	SB/YB	Total
	CH	JB	PB	SB	CB					
<b><u>Bird</u></b>										<b><u>27</u></b>
Northern Fulmar ( <i>Fulmarus glacialis</i> )	2	-	1	-	-	-	-	-	-	3
Brown Pelican ( <i>Pelecanus occidentalis</i> )	1	-	-	-	-	-	-	-	-	1
Common Murre ( <i>Uria aalge</i> )	1	-	-	-	-	-	-	-	1	2
Pelagic Cormorant ( <i>Phalacrocorax pelagicus</i> )	1	-	-	-	-	-	-	-	2	3
Surf Scoter ( <i>Malanitta perspicillata</i> )	-	-	-	-	-	-	-	-	1	1
Western Gull ( <i>Larus occidentalis</i> )	-	-	-	-	-	2	1	7		10
Unidentified gull ( <i>Larus</i> spp.)	-	-	-	1	-	1	-	-	-	1
Unidentified loon ( <i>Gavia</i> spp.)	-	1	-	-	-	-	-	-	-	1
Unidentified bird	4	-	-	-	-	1	-	-	-	5
<b><u>Fish</u></b>										<b><u>10</u></b>
Thornback Ray ( <i>Platyrrhinoidis triseriata</i> )	6	-	-	-	-	-	-	1		7
Ocean Sunfish ( <i>Mola mola</i> )	1	-	-	-	-	-	-	-	-	1
Bat Ray ( <i>Myliobatis californica</i> )	-	-	-	-	-	-	-	1	-	1
Unidentified fish	-	-	-	-	-	1	-	-	-	1
<b><u>Mammals</u></b>										<b><u>15</u></b>
California Sea Lion ( <i>Zalophus californianus</i> )	5	-	2	2	-	2	-	1		12
Feral pig ( <i>Sus scrofa</i> )	2	-	-	-	-	-	-	-	-	2
Unidentified dolphin	1	-	-	-	-	-	-	-	-	1
<b><u>Unidentifiable Item</u></b>	-	-	-	-	1	-	-	-	-	1

CH = Chinese Harbor; JB = Johnson's Beach; PB = Pozo Beach; SB = Sauces Beach; CB = Christy Beach; PH = Prisoner's Harbor; LB = Laguna Beach; SB/YB = Smugglers Beach/Yellowbanks Beach



## Beach Walk Monitoring

Table 2. Carcasses found in November 2003 on Santa Rosa Island and January 2004 on San Miguel Island.

	Santa Rosa							San Miguel		Total
	TC	AC	SC	SP	SK	WC	CP	SM	CH	
<b><u>Bird</u></b>										<b><u>72</u></b>
Northern Fulmar ( <i>Fulmarus glacialis</i> )	3	2	14	4	4	3	5	18	-	53
Western Gull ( <i>Larus occidentalis</i> )	-	-	5	-	1	3	2	-	-	11
Western Grebe ( <i>Aechmophorus occidentalis</i> )	-	-	-	-	1	-	-	-	-	1
Sooty Shearwater ( <i>Puffinus griseus</i> )	1	-	-	-	1	-	-	-	-	2
Rhinoceros Auklet ( <i>Cerorhinca monocerata</i> )	1	-	-	-	-	-	-	1	-	2
Double-crested cormorant ( <i>Phalacrocorax auritus</i> )	-	-	1	-	-	1	-	1	-	3
Pelagic Cormorant ( <i>Phalacrocorax pelagicus</i> )	-	-	-	-	-	1	-	-	-	1
Barn Owl ( <i>Tyto alba</i> )	-	-	-	-	-	1	-	-	-	1
<b><u>Fish</u></b>										<b><u>1</u></b>
Hornshark ( <i>Heterodontus francisci</i> )	1	-	-	-	-	-	-	-	-	1
<b><u>Mammals</u></b>										<b><u>30</u></b>
California Sea Lion ( <i>Zalophus californianus</i> )	-	1	2	3	6	1	3	9	1	26
Northern Elephant seal ( <i>Mirounga angustirostris</i> )	-	-	-	-	-	-	3	-	-	3
unidentified pinniped	-	-	-	-	1	-	-	-	-	1

TC=Tecalote Canyon, AC=Arlington Canyon, SC=Soledad Canyon, SP=Sandy Point, SK= Skunk Point, WC= Water Canyon, CP=Cluster Point/China Beach, SM=Simonton Cove, CH=Cuyler Harbor



## Discussion

During 2003, biologists observed bald eagles feeding upon, or perched near marine mammal carcasses on Chinese Harbor beach on five separate occasions between May and December. Up to eight bald eagles were present at a single time. On another occasion, an eagle was observed feeding on a leopard shark, *Triakis semifasciata*, also at Chinese Harbor (Sharpe *et al.* 2004). These observations demonstrate that bald eagles do feed on marine animal carcasses.

The majority of carcasses appeared to have been scavenged. Common ravens and various gulls were often observed in the area of carcasses and were observed actually feeding on some. Many of the seabird carcasses were missing the breast muscle and or heart which is typical of a predatory bird kill. Some of the seabirds may have been preyed by falcons rather than scavenged after being deposited on the beach.

In nearly all cases it was not possible to determine the cause of death. Very few of the carcasses had any oil or tar on them, and those that did may have been tarred after death.

The Santa Rosa Island surveys picked up an influx of dead northern fulmars. The timing of the surveys may have been coincidental to the birds reaching the beach and thus the detection of the high numbers. Apparently, there were many northern fulmars found in beach surveys in Monterey National Marine Sanctuary a few weeks before (Paul Kelly, California Department of Fish and Game, pers. com.). The influx of northern fulmars was not observed in the Santa Cruz Island surveys.

San Miguel Island has major breeding colonies for California sea lions, harbor seals, elephant seals, and northern fur seals. Point Bennett is the largest rookery on the island; however, large numbers of elephant seals and sea lions breed on the southern beaches and at Cardwell Point. Because of the numbers of pinnipeds and the potential for disturbance of the colonies these beaches are not surveyed. Pup mortality is measured at Point Bennett by the National Marine Fisheries Service (NMFS) biologists during the summer sea lion and fur seal breeding period. Bald eagles have been observed at Point Bennett (Robert DeLong, pers.com.).

Santa Rosa Island is becoming a major breeding ground for elephant seals along the southwest portion of the island. Because of increased use of Santa Rosa Island by pinnipeds, we might expect to see an increase in the number of pinniped carcasses simply due to natural events.

Harbor seals breed on all the islands in the spring and we might expect to see pup carcasses on the beach in late spring. Based on previous beach surveys at the islands, dead harbor seal adults are uncommon beaches. The carcasses are seen in kelp beds occasionally, but rarely on the beaches.

The monthly frequency of the surveys may be too long to detect all beach cast animals. Carcasses are often repositioned on a beach by subsequent high tides or may be buried by

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sand during large wave events. It seems that the majority of carcasses are not found again in subsequent surveys. Though a few individual carcasses may be lost, monthly surveys do seem to give a good overall picture of carcass numbers and may be a more accurate portrayal of the numbers available for scavenging.

Because of lack of replication in this first year, we should exercise caution about conclusions regarding timing of peak numbers of carcasses on beaches. The peak numbers of carcasses on Smugglers and Yellowbanks beaches in 2003 are however supported by peaks in seabird numbers found on beaches during quarterly marine debris surveys 1989-1993 (Fig. 2). Marine mammal carcasses found during the marine debris surveys did not follow any clear pattern, though numbers generally were higher in the spring (Richards 1994).

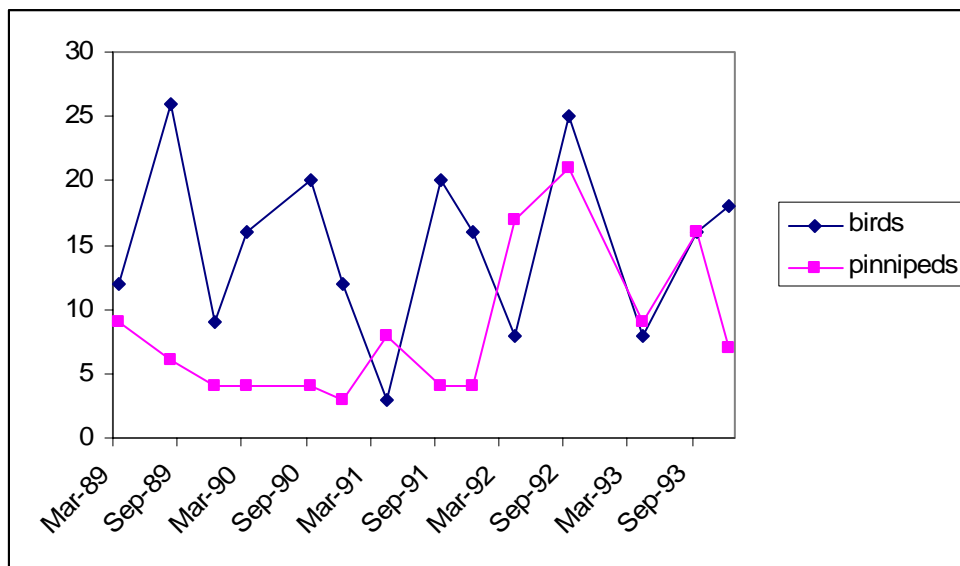


Figure 2. Seabird and pinniped carcasses found during quarterly marine debris surveys from four beaches on Santa Rosa Island and two beaches on San Miguel Island between 1989-1993.

The condition of the carcasses is something that should be considered when looking at potential food sources for bald eagles. Dried/mummified animals may not be very attractive to scavengers. Different scavengers may prefer or accept different stages of decomposing carcasses.

Bald eagles have been regularly sighted on Santa Rosa Island (Sharpe *et al.* 2004). Eagles may be drawn to the island by the deer and elk hunt operation there or possibly by the greater abundance of pinnipeds on the beaches. The beaches there and on San Miguel Island appear from the one-time surveys to have more marine mammal carcasses and therefore more possibility of contaminants. Logistically it is difficult to conduct monthly surveys on these islands. Beginning in 2004, we will try to make quarterly surveys on most beaches.

## **References**

Hass, Todd, and Julia K. Parrish. 2000. Beached Birds: a COASST field guide. Wavefall Press. Seattle, Washington.

Richards, D. V. 1994. National Park Marine Debris Monitoring Program, Channel Islands National Park, 1993 Annual Report. Channel Islands National Park, Ventura, CA

Sharpe, Peter B., Jessica Dooley, David K. Garcelon. 2004. Bald Eagle Restoration on the Northern Channel Islands, California May 2003-December 2003, Second Annual Report. Unpublished report prepared by the Institute for Wildlife Studies, Arcata, California for the National Park Service, Ventura, California. 45 pp.

## **Appendix 1**

### **Beach Monitoring Handbook**

This handbook describes a beach monitoring program designed to provide baseline data about dead and oiled marine life around the various park islands. The issue of bald eagle reintroduction and the need to know what sort of forage items and quantity might be available has brought the need for beach surveys to the forefront. Funding for the beach monitoring pilot program was made available from the Montrose settlement fund for the re-establishment of Bald Eagles onto the northern Channel Islands with additional support from Channel Islands National Park. The purpose of the work is to identify carcasses that will be available to scavenging bald eagles. Pinniped carcasses are of particular interest. This handbook is written for an ideal program of sampling on multiple islands.

Beach monitoring is well-established in programs across the country. Often called Beach Watch Programs, information from beach monitoring is collected for baseline data in the case of an oil spill and provides the basis of education programs about beaches. Trained volunteer corps often conduct many of the programs. Two examples of established programs are at Monterey Bay and Gulf of the Farallones National Marine Sanctuaries. Both of these programs are long-term beach monitoring conducted by volunteers. Both programs have web sites with some information:

[http://www.farallones.org/get\\_involved\\_page/beachwatch.html](http://www.farallones.org/get_involved_page/beachwatch.html)

<http://bonita.mbnms.nos.noaa.gov/research/techreports/beachcombers/beachcomberabstract.html>

Information from the Monterey program can be seen in reports from the Sanctuary at

<http://bonita.mbnms.nos.noaa.gov/Research/bchmon.html>

Why do beach monitoring? There are many goals for a program of beach monitoring. The Volunteer Handbook for Gulf of the Farallones National Marine Sanctuary lists five goals for that program which are closely in line with those for the Channel Islands:

The goals of the Beach Watch program are to help protect and understand our coastal resources:

- By developing baseline information on the Sanctuary's biological resources;
- By creating a long-term data set and index for a particular beach;
- By assisting the Sanctuary in the early detection of natural and human-caused events;
- By developing a network of local experts who can document and discuss changes a specific beach may undergo over several years;
- By educating the public about the coastal environment and by encouraging them to make a difference in protecting the beaches.

The Beach Watch monitoring program is different than the Sandy Beach monitoring we conduct at Santa Rosa Island in many ways; primarily the sandy beach monitoring is designed to look at the detailed ecology of the small invertebrates on the beaches. The beach watch program is about collecting a baseline on the average presence of live and beach cast marine vertebrates.

By counting and tracking the carcasses on beaches we will build a baseline of information about when, where, and how many carcasses are normal at the islands. This information is useful in the event of some environmental event such as an oil spill, disease outbreak, or even El Niño. The number and types of carcasses is important to

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understand what food might be available for scavenging by bald eagles at the islands, thus determining the feasibility of re-introduction.

Additional benefits we hope to obtain from a regular beach watch program:

- *Shorebird counts*- a regular count of snowy plovers and other shorebirds would give a more detailed accounting of their numbers as well as alert us to migration timing and beach use through the seasons.
- *Pinniped counts*- beach use timing and distribution would be obtained.
- *Marine debris monitoring*- we may be able to incorporate some marine debris monitoring to examine changes since that program ended in 1993. Even without the detailed sampling conducted in that program we may be able to easily gather gross information about deposition, timing, and events. Early warnings of potential or real problems could be acted on quickly
- *Visitor use of beaches*- the park would have a regular, if only monthly, look at visitor use of the beaches. Currently, park staff may visit some of the island beaches only once a year in some cases. Violations (vandalism, archeology theft, poaching) might be noticed earlier than without the beach watch.
- *Early warning of invasive species*- regular beach surveys will be able to alert management to any potential problems by invasive species such as river cane, *Arundo donax*, before it becomes well established on the islands.
- *Beach profiles*- Patterns of sand erosion and deposition can be documented photographically.

### **Equipment**

Items needed include: field guides, Beached Marine Birds and Mammals fieldguides, binoculars, digital or regular cameras, rubber gloves, first aid kits, day-packs, tools (knife, pliers, or Leatherman), walkie-talkies (useful for multiple surveyors) and park radios. Tape recorders could be very useful for data recording especially for shorebird counts. This seems like a perfect application for using PDAs for data recording, eliminating paper and clipboards in the wind. Handheld GPS units would be helpful for accurate location data and could be incorporated into the PDAs (note we have not purchased or programmed PDAs for this program). Each team should carry these items.

### **Logistics**

While one person can conduct the survey, teams of two or more are desirable from a safety aspect. Two people should be adequate for the job and preferable for logistics. The number of field teams would be determined by how much overlap of island time there is. Ideally to take advantage of good weather windows there should be one team for each island, possibly two for Santa Cruz. Additional teams could alternate to avoid scheduling and burnout problems.

### **Data Collection**

Collected data are documented on standardized data forms (Appendix). Minimum data collected include: date; name of the person(s) making the observations; beach name and segment number; northern and southern boundary; time survey began and ended; wind and sky conditions; and number of tar balls found or collected. For each encountered

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carcass, the following information is recorded: species; stage of decomposition; age; sex (when possible); evidence of scavenging; evidence for the cause of death; the presence of oil; and whether or not a photograph was obtained. The intended use of the "comments" section is for documentation of any tags present on the carcass, length measurements, photograph roll and frame numbers, or any notes that would aid in post-identification of the encountered carcass. A toe is clipped from seabird carcasses to assess the length of time they may remain on a beach. Prior to clipping a toe, the volunteer documents the number of toes previously removed.

Data are collected monthly by walking the beaches and observing and recording findings onto the standard datasheet. Data are then entered into Access database forms.

Surveys are preferably done during low tides. This is for safety and convenience reasons but there is also a greater likelihood of finding stranded organisms deposited by the tides and waves. Observers may have to zigzag and backtrack to cover all areas adequately.

Never compromise safety. Don't take chances. If the waves are big or other factors make the sampling risky do not attempt it. Use caution around living animals – avoid disturbing them and avoid being bit. Use caution around dead animals and debris as sharp objects may not be readily apparent. Foot protection is recommended.

### ***Filling out the form***

Begin by filling in the top with standard beach names, the sample date, and full names of surveyor(s). Record the beginning time of the survey and note general weather conditions (for use as a check on quality). At the end of the survey enter the ending time and the percentage of the beach covered. If the entire beach was not covered, note why not. The approximate tide level during the survey should be noted (or record the nearest high or low tide time and height).

### **Beached organisms**

Record any stranded animal on this table. If the species cannot be identified, identify it as far as possible (e.g. fish>rockfish>kelp rockfish). Beached Birds (Hass and Parrish 2000) or Beached Marine Birds and Mammals of the North American West Coast (Ainley *et al.* 1994) are excellent references for finds that don't match the photos in regular field guides. Use the codes listed below the table for all applicable columns. Write NA or line through columns that don't apply- do not leave any spaces blank for a specimen except comments.

**Condition:** note the condition of the animal as you found it: 1 (live dying), 2 (fresh dead), 3 (decomposing), 4 (dried, mummified), U (unknown). Note any marine or terrestrial vertebrates (invertebrates should be noted in general notes at the end of the data sheet).

**Sex:** F(female), M (male), U (unknown).there are clues in the beached animals guides.

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**Age:** HY (hatch year), AHY (after hatch year), FY (first year), SY (second year), TY (third year), IM (immature), AD (adult), PC (pup, newly hatched chick/egg, or calf) U (unknown).

Under **Previous/Post** note the number of toes clipped as per instruction on the sheet. Each time an animal is found it should be marked either by toe clipping or alternatively by spraying a paint dot on the animal if it is unlikely to go back into the surf zone. This will tell us the longevity of the animal on the beach and alert us that the carcass has been found before. **Toe Clipping:** Indicate number of toes clipped when you encountered animal (previous), and number clipped when you left it (post). Leave blank if no toes to clip. Indicate "6" if all toes have been clipped on bird with two feet. Indicate "8" if all toes have been clipped on bird with one foot. Indicate "9" if animal is removed from beach. Use comments if necessary.

**Scavenged:** Y (yes), N (no), U (unknown). Has it been pecked open by birds or pigs?

**Probable Causes of Death:** 1 (shot), 2 (tangled in fishing net/line), 3 (tangled in plastic), 4 (unknown), if other write in. Don't guess unless you are sure.

**Oiled:** Y (yes), N (no), U (unknown). Does the body have tar on the feathers or fur?

**Oil Extent:** 1 (small globules, <2% of body), 2 (2-33% of body), 3 (34-66% of body), 4 (67-100% of body).

**Where Oiled:** 1 (dorsal only), 2 (ventral only), 3 (entire body), 4 (head only), 5 (feet only), 6 (wings/flippers only), 7 (other).

**Photo:** Y (yes), N (no). (Record photos in comments)

**Tag:** Y (yes), N (no). Check for flipper tag, leg band, radio collar or glued on transmitter Note type in comments.

**Comments:** Indicate number, color, and location of any tags present. Disposition and label of removed animal. Length measurements. Photo roll and frame numbers. Note if the animal was entangled in line etc.

### Human Activities

Record the number of people engaged in each general activity using the Human Activity Codes: 1-Research, 2-Tidepooling/exploring, 3-Walking, 4-Exercising dog (or other type of pet: note in comments), 5-Sunbathing, 6-Fishing (including clamming or other extractive activity: note specific type in comments), 7-Kayaking, 8-Kite flying, 9-Other.

### Live Animal Count

Record shorebirds and marine mammals that are live and apparently healthy in this table. Use binoculars to look for signs of bands or tags, oil, fishhooks, or entanglement issues and record in comments. Use the tally column for tick marks if needed when birds are encountered in groups then write the total number for the entire beach in the total column. If oiled birds were encountered, record the subtotal in the # oiled column. Use standard common name or accepted four letter codes for the birds.

### Tar and Debris

Note oil or tar on the beach and approximate sizes, amount, and condition. Record the type as tar balls (small <5 cm, usually round globs), pancake (larger than >5 cm globs) or sheets (covering the rocks or sand in a more or less continuous spread). Record the



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amount as low medium or high (this is a judgement call but, examples might be: *low* as present, *medium* might be a small amount spread over most of the beach or frequent tar balls on a section of beach, *high* would be frequently encountered over most of the beach or large patches of tar on a significant stretch of beach) This is a secondary mission and should not interfere with the primary purpose of noting beached animals. This is true also for marine debris. If it does not impact the main purpose, record of the amount of debris on the beach. Comment on the major types of debris and anything that may seem important.

### Notes

Note the presence of river cane (*Arundo donax*) any disturbance to archeological sites, pig activity, accumulations of invertebrates or seaweeds cast up on the beach, or anything unusual.

### Data management

A Microsoft Access database has been developed with the assistance of Laurie Kurilla from Peace of Mind Technologies under contract to the National Park Service. The database opens to the entry form which is similar to the field data sheet. Use the drop down pick lists to identify codes.

### References

Ainley, D.G., R.E. Jones, R. Stallcup, D.J. Long, G. W. Page, L.T. Jones, L. E. Stenzel, R. L. LeValley, and L. B. Spear. 1994. Beached marine birds and mammals of the North American west coast: a revised guide to the r census and identification with supplemental keys to beached sea turtles and sharks. Contract No. 1443-CX-8140-93-011, National Oceanic and Atmospheric Administration, Gulf of the Farallones National Marine Sanctuary, San Francisco, CA 94123.

Hass, Todd, and Julia K. Parrish. 2000. Beached Birds: a COASST field guide. Wavefall Press. Seattle, Washington.



## Beach Walk Monitoring

BEACH \_\_\_\_\_ DATE \_\_\_\_\_

### Human activity (note dogs on beach also)

number	Activity Code	Comments

### Human Activity Codes for Beach Monitoring Survey Form

1-Research, 2-Tidepooling/exploring, 3-Walking, 4-Exercising dog (or other type of pet: note in comments), 5-Sunbathing, 6-Fishing (including clamming or other extractive activity: note specific type in comments), 7-Kayaking, 8-Kite flying, 9-Other

### Live Animal Count (shorebirds/marine mammals etc)

# oiled	Total	Tally(count)	Species	Comments

Band and tag information for live animals. Species, color, location, number, tag type \_\_\_\_\_

Tar balls/pancakes (number, size/type, fresh/weathered): \_\_\_\_\_

Main debris types and approx. quantities: \_\_\_\_\_

Notes (presence of *Arundo donax*, disturbance to archeological sites, pig activity, etc.):

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